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EXAMINER
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DANIELS, MATTHEW J

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PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* CHRISTOPHER H. BAJOREK

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Appeal 2010-002002  
Application 10/659,006  
Technology Center 1700

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Before CHUNG K. PAK, JEFFREY T. SMITH and  
MICHAEL P. COLAIANNI, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

## STATEMENT OF THE CASE

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1 through 16, 18, 19 and 22 through 25. We have jurisdiction under 35 U.S.C. § 6.

Appellant's claimed invention relates to "nano-imprint lithography (NIL) to form raised and recessed zones of a magnetic discrete track recording (DTR) disk." App. Br. 5. Claims 1 is illustrative:

1. A method, comprising:

heating a stamper and a resist film, wherein the stamper is flat;

imprinting the stamper into the resist film;

separating the stamper from the resist film before the resist film is cooled below approximately a glass transition temperature of the resist film; and

cooling the resist film below the glass transition temperature after the separating.

The Examiner relied on the following references in rejecting the appealed subject matter:

Chen et al.	US 4,786,564	Nov. 22, 1988
Chou	US 5,956,216	Sept. 21, 1999
Chou	US 6,309,580 B1	Oct. 30, 2001
Davis	US 2002/0025408 A1	Feb. 28, 2002

Peter Robert Krauss, Nanostructure Engineering: Quantized Magnetic Disk and Nanoimprint Lithography (Sept. 8, 1977) (unpublished Ph.D. dissertation, University of Minnesota) (on file with University of Minnesota).

M. Colburn et al., *Development and Advantages of Step-and-Flash Lithography*, SOLID STATE TECH., July 2001, at 67, 68, 71, 73-76, and 78.

Appellant requests review of the following rejections (App. Br. 6-7)<sup>1</sup> from the Examiner's final office action:

1. Claims 1, 2, 8 and 25 stand rejected under 35 U.S.C § 102(b) as being anticipated by Krauss.
2. Claims 3, 4, 10, 11, 12 and 13 stand rejected under 35 U.S.C. § 103(a) as obvious over Krauss.
3. Claims 1, 2, 8, 11, 12, 18, 22 and 25 stand rejected under 35 U.S.C § 103(a) as obvious over Davis.
4. Claims 3-6 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis in view of Chou '216.
5. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis in view of Chou '216 and Chou '580.
6. Claims 9 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis in view of Colburn.
7. Claims 10 and 13-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis.
8. Claims 23 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Davis in view of Chou '216, Chou '580 and Chen.

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<sup>1</sup> The Examiner withdrew all rejections based on the article by Tan and the rejection under 35 U.S.C. § 112, 1<sup>st</sup> paragraph. Ans. 3-4. Accordingly, we only list the rejections still on appeal.

OPINION<sup>2</sup>  
*Rejections based on Krauss*

The dispositive issue for these rejections is: Did the Examiner err in determining that Krauss describes a process of imprinting a resist where the molded resist is cooled after being separated from the stamper as required by the subject matter of independent claim 1?

We answer this question in the negative and AFFIRM.

The Examiner bears the initial burden of establishing a prima facie case of anticipation. *In re King*, 801 F.2d 1324, 1326-27 (Fed. Cir. 1986). Anticipation under 35 U.S.C. § 102 requires that “each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (quoting *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987)).

The Examiner found that Krauss teaches Appellant’s claimed process. Ans. 5-6. The Examiner also found that the claimed step of cooling the resist film below the glass transition temperature after the separating from the mold was inherent. *Id.* at 6. Additionally, the Examiner found that Krauss discloses the step of separating the mold from the resist film prior to cooling of the resist film. *Id.* at 14; Krauss 83. Based on these findings, the Examiner concluded that Krauss anticipates the subject matter of independent claim 1.

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<sup>2</sup> Appellant has not argued dependent claims separately. Accordingly, the dependent claims stand or fall together with independent claim 1. We will limit our discussion to independent claim 1.

Appellant argues that the Examiner improperly inferred from Krauss' disclosure at page 82, line 17 through page 83, line 12 that Krauss performed the claimed method because that disclosure relates to "method operations other than 'separation before the PMMA had cooled below its glass transition' [which] are undisclosed." App. Br. 8-9. That is, the Krauss disclosure at page 83, lines 10-12, disclosing separation of the mold from the PMMA coated wafer, is unclear as to whether "both the mold and the PMMA coated wafer where [were, sic.] heated in the method that 'resulted in the PMMA flowing.'" *Id.* at 9.

We disagree with Appellant. Krauss' disclosure beginning at page 82, line 17 is directed to an NIL process wherein both the mold and the substrate with PMMA are both heated above the glass transition temperature. Appellant has not disputed that Krauss' disclosure at page 83, lines 10-12 teaches the steps of separating the mold (stamper) from the PMMA film (resist film) before the PMMA film is cooled below its glass transition temperature and cooling the PMMA film after the separating. This disclosure places the person of ordinary skill in the art in possession of the claimed invention. While Appellant argues that the disputed Krauss disclosure relates to undisclosed methods, Appellant has pointed to no section of Krauss that supports Appellant's allegation. Further, Appellant has not directed us to other evidence in support of this allegation. We find no error in the Examiner's determination that the same heating and imprinting steps disclosed on pages 82 and 83 would have been used for the process where the mold is first separated from the PMMA film and the PMMA film is cooled afterwards. Ans. 14.

For the foregoing reasons and those presented by the Examiner, we affirm the rejection of claims 1, 2, 8, and 25 under 35 U.S.C. § 102(b) over Krauss.

Appellant did not separately argue the rejection of dependent claims 3, 4, and 10 through 13 under 35 U.S.C. § 103(a) over Krauss. Accordingly, we affirm this rejection for the reasons presented by the Examiner, as well as for the reasons given above.

*Rejections based on Davis*

The dispositive issue for these rejections is: Did the Examiner err in determining that a person of ordinary skill in the art would have found it obvious to modify the imprinting process of Davis to cool the molded resist after being separated from the stamper as required by the subject matter of independent claim 1?

We answer this question in the negative and AFFIRM.

The Examiner found that Davis discloses a method similar to Appellant's claimed invention. Ans. 7-8. The Examiner also found that "Davis does not explicitly teach 'separating the stamper from the resist film before there is any substantial cooling of the resist film.'" *Id.* at 7. However, the Examiner concluded that "this limitation would have been prima facie obvious over Davis' teachings regarding the mold and resist temperatures" because Davis' disclosure supports an embodiment where "there would not be any substantial cooling of the resist film before separation." *Id.* at 7 and 8. The Examiner also concluded that "Davis teaches that the particular temperatures of both the mold and resist represent result-effective variables that should be optimized in order to (1) optimize

replication, (2) enable substrate release from the mold, and (3) maintain the integrity of the surface features.” *Id.* at 8.

Appellant argues that Davis’ statements in paragraphs [0073] and [0075] concerning the alternatives for and control of mold temperatures are generic alternatives that do not provide specific guidance to one of ordinary skill in the art because they are “not specifically stated to be done during removal of the substrate from the mold.” App. Br. 13 (emphasis omitted). Appellant further argues that the only insightful recitation in Davis’ paragraph [0075] “is the description that ‘typically in order to maintain the integrity of the surface features, the molded substrate is cooled to below the glass transition temperature prior to removal from the mold.’” *Id.* (emphasis omitted). That is, Appellant argues that Davis teaches away from the claimed invention. *Id.* at 14.

We are unpersuaded by Appellant’s argument. We do not find Davis’ disclosure as generic as argued by Appellant. Davis discloses in paragraph [0075] that “[a]fter placing the substrate in the mold the temperature thereof can be maintained, increased or decreased as necessary in order to optimize replication and enable substrate release from the mold while maintaining the integrity of the surface features.” Recognizing that there are only a limited number of alternatives to imprint and cool the resist, we find that this disclosure by Davis provides adequate guidance to one of ordinary skill in the art to arrive to the claimed invention. We agree with the Examiner that the temperatures of the mold represent result effective variables in the Davis process “that should be optimized in order to (1) optimize replication, (2) enable substrate release from the mold, (3) maintain the integrity of the surface features, and (4) reduce cycle time.” Ans. 17.



Appellant submitted a Declaration by David Treves (Declaration) as secondary evidence of unexpected results.<sup>3</sup> App. Br. 15. We agree with the Examiner that the Treves Declaration is not persuasive of patentability of the appealed subject matter. Ans. 19-20. We note that the Declarant's opinion is premised upon several seeming inconsistencies. The Declarant states:

We unexpectedly found that if we selected the embossing temperature slightly above the glass transition temperature of the polymer, the shearing distortion disappeared if we did not cool the mold before opening it. (Declaration 3)

Subsequently the Declarant states:

The range of embossing temperature at which the mold was opened that gave good results was between 126 and 130 degrees C well above the glass transition temperature of 115 degrees C. *Id.*

The Declarant does not provide a discussion as to what temperatures are included in the range "slightly above the glass transition temperature". Notwithstanding these inconsistencies, the claims are not limited to specific parameters including embossing time, temperature, and pressure, or the temperature at which the mold is opened. Consequently, any allegation of unexpected results presented in the Declaration is not commensurate with the scope of the claims and is not probative as to patentability of the claims presented on appeal.

Appellant did not separately argue the rejections of dependent claims 2-16, 18, 19, and 22-25 under 35 U.S.C. § 103(a) based on Davis. Rather, Appellant appears to rely on the same arguments advanced in connection

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<sup>3</sup> The Declaration was entered and considered by the Examiner in the Final Office Action mailed January 22, 2009.

with claim 1 rejected under 35 U.S.C. § 103(a) based on Davis.

Accordingly, we affirm these rejections as well for the reasons given above.

ORDER

The rejection of claims 1, 2, 8 and 25 under 35 U.S.C § 102(b) as anticipated by Krauss is affirmed.

The rejection of claims 3, 4, 10, 11, 12 and 13 under 35 U.S.C. § 103(a) as unpatentable over Krauss is affirmed.

The rejection of claims 1, 2, 8, 11, 12, 18, 22 and 25 under 35 U.S.C § 103(a) as unpatentable over Davis is affirmed.

The rejection of claims 3-6 and 19 under 35 U.S.C. § 103(a) as unpatentable over Davis and Chou '216 is affirmed.

The rejection of claim 7 under 35 U.S.C. § 103(a) as unpatentable over Davis, Chou '216 and Chou '580 is affirmed.

The rejection of claims 9 and 18 under 35 U.S.C. § 103(a) as unpatentable over Davis and Colburn is affirmed.

The rejection of claims 10 and 13-16 under 35 U.S.C. § 103(a) as unpatentable over Davis is affirmed.

The rejection of claims 23 and 24 under 35 U.S.C. § 103(a) as unpatentable over Davis, Chou '216, Chou '580 and Chen is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(v).

AFFIRMED

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